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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,977	03/11/2004	Sam S. Tsai	19507-003	4055

60951 7590 12/24/2008
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EXAMINER	
FINDLEY, CHRISTOPHER G	

ART UNIT	PAPER NUMBER
2621	

MAIL DATE	DELIVERY MODE
12/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/796,977	**Applicant(s)** TSAI ET AL.	
	Examiner CHRISTOPHER FINDLEY	**Art Unit** 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7,16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7,16 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 10/15/2008 have been fully considered but they are not persuasive.

2. Re claim 1, the Applicant contends that the prior art cited fails to teach or suggest scaling the motion vectors as a self-contained, independent layered bitstream, wherein a number of a compressed frequency bands and a number of the corresponding compressed motion vectors in an output bitstream are not the same. However, the Examiner respectfully disagrees. Ye discloses that in some embodiments, bi-directional temporal filters are used for the lower bands and forward-only filters are used for the higher bands (Ye: paragraph [0032]), thereby indicating that one layer may require at least 2 motion vectors while another layer requires only one motion vector.

3. Re claim 1, the Applicant also contends that in Turaga's coding scheme, the entropy coding technique for wavelet coefficients is also applied to the motion vectors, and both motion vector and wavelet coefficient are processed by the same entropy coding block, while the coding scheme of the current application contrastingly applies different entropy coding techniques to the wavelet coefficients and the motion vectors by way of different paths for the wavelet coefficients and the motion information and also two separate entropy coding blocks. However, the Examiner respectfully disagrees with the Applicant's assertion. The claim language presented by the Applicant includes a wavelet coefficients entropy encoder connected to a spatial analyzer and a motion information encoder connected to the motion estimator, wherein said conditions are met

by the entropy encoding block cited previously (Turaga: Fig. 2, entropy encoding block 14; column 5, lines 21-30). Therefore, the claims do not state that the wavelet coefficient entropy encoder and motion information encoder are separate, and, therefore, indicate that a single entropy encoding block may process both the coefficients and the motion information, since the language does not preclude such an instance.

4. Re claims 7 and 16-17, the Applicant contends that Ye fails to teach or suggest that partitioned motion information and texture signals can be successfully decoded because the Applicant asserts that the motion information does not have a layer structure. However, the Examiner respectfully disagrees. Ye discloses that each MCTF includes a motion estimator (Ye: paragraph [0031]) and that each MCTF may also use independent temporal prediction schemes (Ye: paragraph [0032]). One of ordinary skill in the art at the time of the invention would have found it obvious that each scheme (i.e., forward prediction, bi-directional prediction) has its own unique motion vectors, and, therefore, in view of Ye's disclosure that enhancement layers are only decoded if possible (Ye: [0077]), a picture can be reconstructed even if only some of the layers are decoded since each layer has its own corresponding unique set of motion vectors.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 7, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ye et al. (US 20060146937 A1) in view of Turaga et al. (US 7023923 B2).

Re **claim 1**, Ye discloses a method for interframe wavelet video coding, said method comprising: an encoder for inputting video frames (Ye: Fig. 1, element 110; paragraph [0020]), comprising a Motion Compensated Temporal Filtering (MCTF) analyzer (Ye: Fig. 2, elements 204a-204n; paragraph [0030]), a spatial analyzer connected to said MCTF analyzer (Ye: Fig. 2, element 202; paragraph [0029], the transform spatially decomposes a video frame into bands), a wavelet coefficients encoder connected to said spatial analyzer (Ye: Fig. 2, element 202; paragraph [0029], each band is represented by wavelet coefficients), a packetizer connected to said wavelet coefficients encoder to bundle a compressed video content bitstream and a compressed motion information (MI) into a single compound compressed bitstream (Ye: Fig. 2, element 212, multiplexing for transmission over a network indicates packetizing data, wherein encoded coefficients from the EZBC coder 208 and encoded motion vectors from the motion vector encoder 210 are multiplexed into a single output bitstream 220), a motion estimator embedded or connected to said MCTF analyzer (Ye: paragraph [0031], each MCTF has a motion estimation unit), and a Motion Information (MI) encoder connected to said motion estimator (Ye: Fig. 2, element 210; paragraph [0040]); having a decoder for outputting video frames (Ye: Fig. 1, element 118; paragraph [0023]), said decoder comprises a de-packetizer (Ye: Fig. 4, element 402;

paragraph [0043], the demultiplexer separates bands and motion vectors, indicating depacketizing, wherein Fig. 4 corresponds to element 118 of Fig. 1), a wavelet coefficients decoder connected to said de-packetizer (Ye: Fig. 4, element 410; paragraph [0046]), a spatial synthesizer connected to said wavelet coefficients decoder (Ye: paragraph [0046], bands are transformed back into the spatial domain), an MCTF synthesizer connected to said spatial synthesizer (Ye: Fig. 4, element 408a-408n; paragraph [0045]), and an MI decoder connected to said de-packetizer and said MCTF synthesizer (Ye: Fig. 4, element 406; paragraph [0044]); and having a puller connected to said encoder and said decoder, wherein said method is to partition an MI for scaling motion vectors as a self-contained, independent layered bitstream, and to transfer a partition of said MI to a terminal to achieve scalability (Ye: paragraph [0029], separation of the signal into bands acts as a means for creating scalability); and wherein a number of a compressed frequency bands and a number of the corresponding compressed motion vectors in an output bitstream are not the same (Ye: paragraph [0032], in some embodiments, bi-directional temporal filters are used for the lower bands and forward-only filters are used for the higher bands, thereby indicating that one layer may require at least 2 motion vectors while another layer requires only one motion vector); and wherein the motion vectors of each of said frequency bands are encoded independently, each having its own bitstream layer structures (Ye: paragraph [0032], in some embodiments, bi-directional temporal filters are used for the lower bands and forward-only filters are used for the higher bands, thereby indicating that the motion information of each layer is independent of the other layers).

Ye does not explicitly disclose that the wavelet coefficient encoder, the motion information encoder, the wavelet coefficient decoder, and the motion information decoder are entropy encoders or entropy decoders. However, Turaga discloses motion compensated temporal filtering based on multiple reference frames for wavelet based coding, wherein wavelet coefficients and motion are entropy encoded (Turaga: column 5, lines 21-26) and the wavelet coefficients and motion information are entropy decoded (Turaga: column 7, lines 6-13). Since both Ye and Turaga relate to motion compensated temporal filtering and wavelet transformation, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the entropy encoding and entropy decoding of Turaga with the coding scheme of Ye in order to maximize coding efficiency by utilizing variable length codewords (Turaga: column 5, lines 28-30). The combined system of Ye and Turaga has all of the features of claim 1.

Re **claim 7**, Ye discloses that said MI encoder is to split all motion vectors of all said partitions into a base layer and one or more enhancement layers (Ye: paragraphs [0040]-[0041]; each band is equivalent to a layer) and to apply MI coding on said base layer and said enhancement layers to compress said MI applied with MI encoding so that wherein an output of the compressed MI is obtained by an input of said MI (Ye: paragraph [0070], motion vector encoder receives the motion vectors from the MCTFs and compresses the motion vectors, wherein said compressed motion vectors are sent to a multiplexer to create a bitstream); and said compressed MI can be partially decoded (Ye: paragraph [0077], enhancement layers are decoded only if possible,

indicating that a picture can be reconstructed when only some of the bands can be decoded).

Ye does not explicitly disclose that the motion information encoding is entropy encoding. However, Turaga discloses motion compensated temporal filtering based on multiple reference frames for wavelet based coding, wherein wavelet coefficients and motion are entropy encoded (Turaga: column 5, lines 21-26) and the wavelet coefficients and motion information are entropy decoded (Turaga: column 7, lines 6-13). Since both Ye and Turaga relate to motion compensated temporal filtering and wavelet transformation, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the entropy encoding and entropy decoding of Turaga with the coding scheme of Ye in order to maximize coding efficiency by utilizing variable length codewords (Turaga: column 5, lines 28-30).

Re **claim 16**, Ye discloses that said MI decoder is to apply MI decoding on received partial or complete compress MI and combine a base layer and decoded enhancement layers (Ye: paragraphs [0044]-[0047] and [0077]-[0079], base layer and enhancement layers) and said MI decoder to form a motion vector so that an output of an MI is obtained by an input of said compressed MI applied with MI encoding (Ye: paragraphs [0044]-[0047] and [0077]-[0079], base layer and enhancement layers).

Ye does not explicitly disclose that the motion information encoder and the motion information decoder are entropy encoders or entropy decoders. However, Turaga discloses motion compensated temporal filtering based on multiple reference

frames for wavelet based coding, wherein wavelet coefficients and motion are entropy encoded (Turaga: column 5, lines 21-26) and the wavelet coefficients and motion information are entropy decoded (Turaga: column 7, lines 6-13). Since both Ye and Turaga relate to motion compensated temporal filtering and wavelet transformation, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the entropy encoding and entropy decoding of Turaga with the coding scheme of Ye in order to maximize coding efficiency by utilizing variable length codewords (Turaga: column 5, lines 28-30).

Re **claim 17**, Ye discloses that said puller is to read bit-rate/frame-rate/image-size information to partition a compressed video content bitstream (Ye: paragraph [0032], band filtering depends on optimizing the efficiency/complexity constraints); to decide whether one or more enhancement layers are needed on said bit-rate/frame-rate/image-size (Ye: paragraph [0033], band filtering depends on optimizing the efficiency/complexity constraints); to send the MI of a base layer (Ye: Fig. 7; paragraphs [0068]-[0070], since the base layer is the layer with the minimum amount of information required for reconstructing a picture, its motion information is always sent); and to combine said partitioned compressed video content bitstream and a partitioned MI obtained by partitioning the MI of said enhancement layers according to said bit-rate/frame-rate/image-size, to form said compressed bitstream (Ye: paragraphs [0068]-[0070]; Fig. 2, element 212; paragraph [0070], multiplexer combines compressed video bands and compressed motion vectors into a bitstream).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. 3-D morphological operations with adaptive structuring elements for clustering of significant coefficients within an overcomplete wavelet video coding framework

Turaga et al. (US 20070110162 A1)

b. Method for coding a video image taking into account the part relating to a component of a movement vector

Boisson et al. (US 20070189389 A1)

c. Scalable encoding and decoding of interlaced digital video data

Marquant et al. (US 20070147492 A1)

d. Fully scalable 3-d overcomplete wavelet video coding using adaptive motion compensated temporal filtering

Ye et al. (US 20060008000 A1)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER FINDLEY whose telephone number is (571)270-1199. The examiner can normally be reached on Monday-Friday (8:30 AM-5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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